IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of
LEVERS
Serial No. 10/539,016
Filed: June 16, 2005
For: AIRCRAFT COMPONENT MANUFACTURING TOOL AND METHOD

Confirmation No.: 7399
Atty. Ref.: 540-569
Group: 1793
Examiner: N. D'Aniello

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APPEAL BRIEF

On Appeal From Group Art Unit 1793

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October 6, 2009

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P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

I. REAL PARTY IN INTEREST

The real party in interest in the above-identified appeal is Airbus UK Limited by virtue of an assignment of rights from BAE Systems plc recorded April 20, 2006 at Reel 17791, Frame 981 and the assignment of rights from the inventor to BAE Systems plc recorded June 16, 2005 at Reel 17446, Frame 641.

II. RELATED APPEALS AND INTERFERENCES

There are believed to be no related appeals, interferences or judicial proceedings with respect to the present application, other than the Pre-Appeal Brief Request for Review previously filed in this appeal on July 6, 2009.

III. STATUS OF CLAIMS

Claims 1-5, 7-26, 38 and 39 stand variously rejected in the outstanding Final Rejection. Claim 6 has been cancelled without prejudice. Claims 27-37 stand withdrawn by the Examiner based upon the conclusion that these claims as amended are anticipated by Haas (U.S. Patent 6,089,061) and therefore there is no special technical feature linking the method and apparatus claims. Inasmuch as this restriction requirement is based upon the appealable finding of anticipation, the withdrawn claims are believed subject to appeal. The above rejection of claims 1-5, 7-26, 38 and 39, in addition to the withdrawal of claims 27-37 based upon the allegation that the special technical feature is anticipated in withdrawn claims 27-37, is appealed.

IV. STATUS OF AMENDMENTS

No further response has been submitted with respect to the Final Official Action in this application other than the filing of a Pre-Appeal Brief Request for Review as noted above, which decision by the Panel was mailed July 21, 2009.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Appellant's specification and figures provide an explanation of the claimed invention set out in independent claims 1, 21, 27 and 35, with each claimed structure and method step addressed as to its location in the specification and in the figures.

"1. Apparatus for modifying the shape of an aircraft component [component 4 as shown in Figure 4 and discussed on page 18, lines 1-9 and elsewhere in the specification] by creep forming [as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] the component [4], the apparatus including:

a shaped surface [dotted line 3 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] so arranged that an aircraft component may be forced against the shaped surface in a manner that modifies the shape of the aircraft component [discussed on page 18, lines 12-21 and elsewhere in the specification],

an intermediate member [intermediate plate 12 as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] for receiving and supporting the component [4], said intermediate member [12] is positioned between the shaped surface [3] and the component [4], and deforms to a shape

dependent on the shape of the shaped surface [3], wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements [rib boards 6 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] separated by gaps [gaps are shown in Figures 3a and 3b and discussed on page 19, lines 13-23 and elsewhere in the specification], the shape to which the component [4] may be modified being dependent on the shape defined by a notional smooth surface [3] enveloping the elements [6] and bridging the gaps, the intermediate member [12] being sufficiently stiff that during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps [as shown in Figure 5 and discussed on page 22, lines 9-11 and 27-30 and elsewhere in the specification]."

"21. Apparatus for modifying the shape of an aircraft component [component 4 as shown in Figure 4 and discussed on page 18, lines 1-9 and elsewhere in the specification] by creep forming [as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] the component [4], the apparatus including:

a shaped surface [dotted line 3 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] so arranged that an aircraft

component may be forced against the shaped surface in a manner that modifies the shape of the aircraft component [discussed on page 18, lines 12-21 and elsewhere in the specification],

an intermediate member [intermediate plate 12 as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] located between said shaped surface [3] and said aircraft component [4], and

a bagging apparatus [vacuum bag 5 as shown in Figure 5 and discussed on page 22, lines 1-11 and elsewhere in the specification] wherein the bagging apparatus is arranged such that the component is forced against the shaped surface by means of an air pressure difference that is at least partially provided by suction via said bagging apparatus [discussed on page 22, lines 6-19 and elsewhere in the specification], wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements [rib boards 6 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] separated by gaps [gaps are shown in Figures 3a and 3b and discussed on page 19, lines 13-23 and elsewhere in the specification], the shape to which the component [4] may be modified being dependent on the shape defined by a notional smooth surface [3] enveloping the elements [6] and bridging the gaps, the intermediate member being sufficiently stiff that in use during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially

no local deformation in regions of the intermediate member that bridge the gaps [as shown in Figure 5 and discussed on page 22, lines 9-11 and 27-30 and elsewhere in the specification]."

"27. A method of modifying the shape of an aircraft component [component 4 as shown in Figure 4 and discussed on page 18, lines 1-9 and elsewhere in the specification] by creep forming [as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] the component [4], the method including the steps of

providing a shaped surface [dotted line 3 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] and an intermediate member [intermediate plate 12 as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification], said intermediate member [12] located between said shaped surface [3] and said aircraft component [4], wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements [rib boards 6 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] separated by gaps [gaps are shown in Figures 3a and 3b and discussed on page 19, lines 13-23 and elsewhere in the specification], the shape to which the component [4] may be modified being dependent on the shape defined by a notional smooth surface enveloping the elements [6] and bridging the gaps, the intermediate member [12]

being sufficiently stiff that during the forcing of the aircraft component against the shaped surface [3], the intermediate member [12] deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps [as shown in Figure 5 and discussed on page 22, lines 9-11 and 27-30 and elsewhere in the specification],

forcing an aircraft component [4] against the shaped surface [3], via the intermediate member [12], in a manner that modifies the shape of the aircraft component [as shown in Figure 5 and discussed on page 22, lines 9-11 and elsewhere in the specification], and

removing the aircraft component [as discussed on page 23, lines 1-8 and elsewhere in the specification]."

"35. A method of modifying the shape of an aircraft component [component 4 as shown in Figure 4 and discussed on page 18, lines 1-9 and elsewhere in the specification] by creep forming [as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification] the component [4], the method including the steps of

providing a shaped surface [dotted line 3 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification], wherein the shaped surface [3] is defined by an open structure, the open structure including

spaced apart elements [rib boards 6 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] separated by gaps [gaps are shown in Figures 3a and 3b and discussed on page 19, lines 13-23 and elsewhere in the specification], the shape to which the component [4] may be modified being dependent on the shape defined by a notional smooth surface [dotted line 3 as shown in Figure 2a and discussed on page 18, lines 12-21 and elsewhere in the specification] enveloping the elements [6] and bridging the gaps, an intermediate member [intermediate plate 12 as shown in Figure 5 and discussed on page 21, lines 22-31 and elsewhere in the specification], positioned between said shaped surface [3] and said component [4], being sufficiently stiff that during the forcing of the aircraft component against the shaped surface [3], the intermediate member [12] deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps [as shown in Figure 5 and discussed on page 22, lines 9-11 and 27-30 and elsewhere in the specification],

forcing, by means of an air pressure difference, an aircraft component [4] against the shaped surface [3] in a manner that modifies the shape of the aircraft component [as shown in Figure 5 and discussed on page 22, lines 9-11 and elsewhere in the specification], and

removing the aircraft component [as discussed on page 23, lines 1-8 and elsewhere in the specification], wherein the air pressure difference is at least

partially provided by suction via a bag of a bagging apparatus [vacuum bag 5 as shown in Figure 5 and discussed on page 22, lines 1-11 and elsewhere in the specification] , the bag [5] encompassing both the aircraft component [4] and at least a portion of the support structure [6] on the opposite side of the shaped surface [3] to the aircraft component [4]."

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 10-17, 38 and 39 stand rejected under 35 USC §102 as being anticipated by Haas (U.S. Patent 6,089,061).

Claims 4, 5, 7-9, 18 and 19 stand rejected under 35 USC §103 as unpatentable over Haas.

Claims 1 and 18-26 stand rejected under 35 USC §103 as unpatentable over Bornschlegl (U.S. Patent 6,264,771) in view of Haas.

Claims 27-37 stand withdrawn by the Examiner based solely upon the Examiner's finding that "the Haas et al. reference still anticipates the claims as amended (see below) [and that] there is no special technical feature linking the method and apparatus claims" which finding, if reversed, would obviate the withdrawal.

VII. ARGUMENT

Appellant's arguments include the fact that the burden is on the Examiner to first and foremost properly construe the language of the claims to determine what structure and/or method steps are covered by that claim. After proper construction of the claim language, the burden is also on the Examiner to demonstrate where a single reference (in the case of anticipation) or a plurality of references (in the case of an obviousness rejection) teaches each of the structures and/or method steps recited in independent claims 1, 21, 27 and 35.

The Court of Appeals for the Federal Circuit has noted in the case of *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick*, 221 USPQ 481, 485 (Fed. Cir. 1984) that "[a]nticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim."

Furthermore, the Court of Appeals for the Federal Circuit has stated in the case of *In re Rouffet*, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998)

> to prevent the use of hindsight based on the invention to defeat patentability of the invention, this court **requires** the examiner to show a **motivation** to combine the references that create the case of obviousness. In other words, the Examiner **must show reasons** that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. (Emphasis added).

In its recent decision, the U.S. Supreme Court in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (April 2007), held that it is often necessary for a court to look to interrelated teachings of multiple patents, the effects of demands known to the design community or present in the marketplace and the background knowledge possessed by a person of ordinary skill in the art in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. The Supreme Court held that "[t]o facilitate review, this analysis should be made explicit." *Id.* at 1396.

The Supreme Court in its *KSR* decision went on to say that it followed the Court of Appeals for the Federal Circuit's advice that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness" (the Supreme Court quoting from the Court of Appeals for the Federal Circuit in *In re Kahn*, 78 USPQ2d 1329 (Fed. Cir. 2006)).

A. The Examiner's finding that Haas anticipates the "special technical feature linking the method and apparatus claims" upon which the restriction requirement is based is an appealable issue and is without support under 35 USC §102

On page 2 under the heading "Election/Restrictions," in response to Appellant's pointing out that the subject matter of previous claim 6 (now cancelled and added to independent claims 1, 21, 27 and 35), the Examiner has made a finding

that the Haas et al reference "anticipates the claims as amended." Accordingly, while restriction requirements are not normally appealable, because the Examiner has predicated the restriction requirement upon his belief that the subject matter of claim 6 is anticipated by the Haas reference the "anticipation" issue is appealable. The Examiner's conclusion that the feature of claim 6 cannot be a "special technical feature linking the method and apparatus claims" and thus claims 27-37 must be withdrawn is based solely upon the anticipation rejection of the subject matter of former claim 6 and now included in independent claims 1, 21, 27 and 35 and thus is an appealable issue.

As will be seen in the subsequent discussions, the feature of claim 6 which has been added to the independent claims is not shown or rendered obvious in the Haas reference and therefore, pursuant to the Patent Cooperation Treaty rules, the Examiner has no statutory basis for the restriction requirement because the Examiner has improperly disregarded the "special technical feature linking the method and apparatus claims," i.e., the shaped surface is defined by an open structure, the open structure including spaced apart elements separated by gaps."

Based upon the language of the claims and the disclosure contained in the Haas reference, this feature is a special technical feature linking all independent claims, both method and apparatus, and is not anticipated by the Haas reference. Therefore the Examiner's finding that Haas anticipates those claims is incorrect and the Board should so find. Upon the Board's finding that the Haas reference does not

anticipate the special technical feature, Appellant will submit the appropriate Petition to the Commissioner to withdraw the restriction requirement, which Petition cannot be filed until the Board finds that Haas does not anticipate the claimed feature of all independent claims.

B. The Examiner improperly ignores positively recited limitations in each of independent claims 1, 21, 27 and 35

In all independent claims, there is recited the requirement of "the open structure including spaced apart elements separated by gaps." There is also required an "intermediate member . . . positioned between the shaped surface and the component."

The claim requirement that the open structure be comprised of "spaced apart elements" is not in dispute. The common meaning of the word "spaced" is that the elements must be separated by a space and accordingly are not in contact with each other. Although perhaps redundant, the claim limitation also requires that the elements be "separated by gaps." The common definition of "gap" in *Webster's Ninth New Collegiate Dictionary* is "a break in a barrier (as a wall, hedge, or line of military defense)." The second definition of "gap" as a verb is "to make an opening in . . . ." These two aspects of the "open structure" give the claimed structure its name, i.e., an "open structure." As will be seen, the Examiner appears to ignore this specifically recited claim limitation in determining that the independent claims are either anticipated or obvious in view of Haas and/or Bornschlegl.

Each of the independent claims also requires "an intermediate member . . . positioned between the shaped surface and the component." The plain language of these words is that there must be an "intermediate member" between the open structure and the shaped surface. Each of the claims goes on to specify a required level of stiffness of the intermediate member because it must "deform substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps." As will be seen, when properly construed, this "intermediate member" limitation is simply not disclosed or rendered obvious by the Bornschlegl reference.

The Examiner's apparent failure to properly construe the recited "spaced apart elements separated by gaps" and/or the recited "intermediate member" with its recited limitations, constitutes reversible error and consideration thereof by the Board is respectfully requested.

C. The Examiner fails to support his rejection under 35 USC §102 as the reference discloses neither "spaced apart elements" nor "gaps"

As noted above in the *Lindemann* case, it is incumbent upon the Examiner in an anticipation rejection to demonstrate how and where "each and every element of the claimed invention" is disclosed in the prior art reference and is "arranged as in the claim." As will be seen, the Haas reference does not disclose

or render obvious either "spaced apart elements" or "gaps," both of which are elements or structural arrangements specified in each of the independent claims.

1. Haas fails to teach "spaced apart elements"

Beginning on page 2 and continuing to page 3 of the Final Official Action, the Examiner contends that the Haas structure is "defined by an open structure, which is separated by the gaps between the pins (see figure 4B element 150 represents a gap." However, element 150, that the Examiner refers to, is the "external chamfers or radii 150 (FIG. 4B)." As can be seen in Haas, there is no spacing between any of the pins, although the chamfers or radii on the corners of the pins permit gaps 150. However, even if the Examiner considers there to be gaps between non-adjacent elements, it is clear that each element is in full contact with the next adjacent element. Thus, the elements cannot possibly be separated or "spaced apart" as required by the claims.

The Examiner also suggests that Figures 5 and 6 show the pins in more detail and show them in "spaced apart" form. However, the Examiner's attention is directed to column 6, lines 47-53 in which it is explained that each of Figures 5 and 6 is a "**exploded perspective view**." By definition, an exploded view illustrates components which are spaced apart or "exploded" for ease of description contrary to their normal orientation. Figures 5 and 6 merely illustrate

the arrangement in Figure 4B which specifically depicts the array "in side-by-side relationship."

Thus, the Examiner's reliance upon Figures 5 and 6 which are clearly specified as only teaching spaces in an "exploded view" is misplaced.

2. Haas fails to teach any "gaps"

Again, Appellant notes that the gaps 150 referenced by the Examiner do not meet the common definition of "gap," i.e., "a break in a barrier," and therefore no gaps are disclosed in Haas. Even if there were gaps, the elements are still not "spaced apart" as clearly shown in Figure 4B. Figures 5 and 6 showing "exploded views" do not aid the Examiner's position.

Accordingly, the Haas reference does not show all claimed limitations and therefore cannot support an anticipation rejection of the independent claims 1, 21, 27 & 35 or claims dependent thereon or any *prima facie* case of obviousness with respect to the independent claims or claims dependent thereon.

D. The Examiner fails to support his rejection of claims 4, 5, 7-9, 18 and 19 under 35 USC §103 over Haas

As discussed above, Haas, which does disclose what the Examiner considers to be an intermediate member, specifically teaches that each of the elements **not be** "spaced apart" or "separated by gaps."

Furthermore, is noted that if the translating pins of Haas were separated by gaps as disclosed in Bornschlegl, then Haas would be inoperative because they would not "have planar sides which prevent their rotation by the restraining action of adjacent translating pins and with the retaining sidewalls of the pin array" as required by Haas (see Column 1, lines 55-58). In other words, if the Haas pins were actually separated, as contended by the Examiner, the pins would be able to rotate and therefore the turning of the lead screw 10 under each of the pins would not result in adjustable vertical movement of the pin – instead, the pin would merely rotate about its axis. So quite clearly, if the pins of Haas were combined with the spacing of Bornschlegl, they would not be vertically adjustable as required by Haas.

Thus, Haas cannot possibly teach the required limitations of the independent claims and in fact would clearly lead one of ordinary skill in the art away from the claimed combination.

E. The Examiner fails to support his rejection of claims 1 and 18-26 under 35 USC §103 over Bornschlegl in view of Haas

The Bornschlegl reference clearly fails to teach any "intermediate member" as discussed in Appellant's claims. In fact, as previously noted, Bornschlegl requires that the shaped surface bear directly on the aircraft component and thus would lead one of ordinary skill in the art away from using an intermediate member.

The Haas reference, as noted above, required each of the pins to be adjacent each other so that when the screw threads under each pin is turned, the pin doesn't rotate and the turning threads adjust the vertical position of the pin. With a gap between pins, they are free to turn and therefore could not be adjusted vertically.

The combination of Bornschlegl and Haas would simple not work and therefore would not be combinable under 35 USC §103 and cannot support any *prima facie* case of obviousness of claims 1 and 18-26.

F. The Examiner fails to provide the required "analysis" of his rationale for combining elements from the Haas and Bornschlegl references

As required by the Supreme Court in *KSR*, it is incumbent upon the Examiner to provide an explicit "analysis" as to his rationale for picking and choosing elements from the various references and then combining them in the manner of Applicant's independent claims.

As noted above, the Examiner appears to have ignored the fact that Haas does not teach spaced apart pins and indeed, if the elements were spaced apart, they would not be adjustable (they would merely rotate themselves as the underlying jack screw is turned).

While Haas does teach what the Examiner contends is an intermediate member, this is not present in Bornschlegl and Bornschlegl, while teaching spaced apart elements, does not teach the use of an intermediate member. Unfortunately, the

Examiner has not provided any indication as to how or why Bornschlegl's "teaching away" from using an intermediate member and Haas's "teaching away" from separation from spaced apart elements and separation by gaps would not discourage one from combining references.

The failure to provide the *KSR* required explicit "analysis" is an indication that the Examiner has failed to establish a *prima facie* case of obviousness.

G. The Examiner ignores the facts that both references would "teach away" from the claimed invention thereby rebutting any *prima facie* case of obviousness

As noted above, the Haas reference not just suggests, but requires each of the pins to be in contact with its neighbor or it would not operate (no vertical adjustment would be possible by means of the lead screws turning). The Bornschlegl reference suggests there is no need for an intermediate member. Neither reference suggests an intermediate member that is "sufficiently stiff" as required by the claims.

It is well settled that, even if a *prima facie* case of obviousness is set out by the Examiner, it is fully and completely rebutted if it can be shown that the prior art "teaches away" from the claimed combination. As noted above, both Haas and Bornschlegl teach away from the claim, thereby rebutting any *prima facie* case of obviousness.

VIII. CONCLUSION

The Examiner has apparently failed to properly construe the "open structure including spaced apart elements separated by gaps" and the "intermediate" member having the specified "stiffness" in each of the pending independent claims. The Examiner misconstrues the Haas reference which not only doesn't teach "spaced apart" elements, but actually requires no spacing between elements for the device to properly operate. The Examiner's errors in misapplying Haas as an anticipatory reference led him to conclude that there was no "special technical feature linking the method and apparatus claims" and the misplaced restriction requirement withdrawing claims 27-37 in this PCT National Phase application.

Even with the combination of Haas and Bornschlagl, the claimed combination of elements is missing. The Examiner fails to provide the required "analysis" as to why one would combine features from the prior art references. Finally, even if a *prima facie* case of obviousness was set out, the Haas teaching away from "spaced apart" rebuts the case of obviousness.

As a result of the above, there is simply no support for the rejections of Appellant's independent claim or claims dependent thereon under 35 USC §102 and/or §103. Thus, and in view of the above, the rejection of claims 1-5, 7-26, 38 and 39 under 35 USC §§102 and 103 as well as the "anticipation" predicate for the

improper withdrawal of claim 27-37 is clearly in error and reversal thereof by this Honorable Board is respectfully requested.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____

Stanley C. Spooner
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SCS:kmm
Enclosure

IX. CLAIMS APPENDIX

1. Apparatus for modifying the shape of an aircraft component by creep forming the component, the apparatus including:

a shaped surface so arranged that an aircraft component may be forced against the shaped surface in a manner that modifies the shape of the aircraft component,

an intermediate member for receiving and supporting the component, said intermediate member is positioned between the shaped surface and the component, and deforms to a shape dependent on the shape of the shaped surface, wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements separated by gaps, the shape to which the component may be modified being dependent on the shape defined by a notional smooth surface enveloping the elements and bridging the gaps, the intermediate member being sufficiently stiff that during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps.

2. An apparatus according to claim 1, wherein the intermediate member is generally sheet-like in shape.

3. An apparatus according to claim 2, wherein the intermediate member has a constant thickness across the majority of its area.

4. An apparatus according to claim 1, wherein the intermediate member is, prior to use of the apparatus, substantially flat.

5. An apparatus according to claim 1, wherein the intermediate member is such that it repeatedly deforms to substantially the same shape, that shape being dependent on the shape of the shaped surface.

6. (cancelled).

7. An apparatus according to claim 1, wherein the intermediate layer is arranged to be free to move over the shaped surface within predefined boundaries.

8. An apparatus according to claim 1, wherein the apparatus is arranged such that the aircraft component is free to move in directions substantially parallel to the shaped surface.

9. An apparatus according to claim 8, wherein the apparatus is arranged such that, in use, the aircraft component is prevented from moving beyond predefined boundaries.

10. An apparatus according to claim 1, wherein the shaped surface comprises an open structure.

11. An apparatus according to claim 10, wherein the open structure comprises a multiplicity of spaced apart elements and the shape to which the component may be modified is dependent on the shape defined by a notional surface that envelopes the elements.

12. An apparatus according to claim 1, wherein the shaped surface is defined by a multiplicity of separate elements.

13. An apparatus according to claim 12, wherein the elements are arranged in groups, each group comprising a plurality of elements, the elements in each group being mounted in fixed relation to each other.

14. An apparatus according to claim 11, wherein the elements are in the form of ribs.

15. An apparatus according to claim 11, wherein the elements are removably mounted on the apparatus.

16. An apparatus according to claim 11, wherein the elements are fixed in position on the apparatus by means of a portion of the element that engages with a corresponding portion of the apparatus, the portions and corresponding portions being shaped such that they do not restrict movement of the elements away from the apparatus.

17. An apparatus according to claim 1, wherein the shaped surface is rigid.

18. An apparatus according to claim 1, wherein the apparatus is arranged such that the component is, in use, forced against the shaped surface by means of an air pressure difference.

19. An apparatus according to claim 18, wherein the air pressure difference is at least partially provided by suction.

20. An apparatus according to claim 19, wherein the suction is provided via a bag of a bagging apparatus.

21. Apparatus for modifying the shape of an aircraft component by creep forming the component, the apparatus including:

a shaped surface so arranged that an aircraft component may be forced against the shaped surface in a manner that modifies the shape of the aircraft component,

an intermediate member located between said shaped surface and said aircraft component, and

a bagging apparatus wherein the bagging apparatus is arranged such that the component is forced against the shaped surface by means of an air pressure difference that is at least partially provided by suction via said bagging apparatus, wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements separated by gaps, the shape to which the component may be modified being dependent on the shape defined by a notional smooth surface enveloping the elements and bridging the gaps, the intermediate member being sufficiently stiff that in use during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps.

22. An apparatus according to claim 20, wherein the apparatus is arranged such that the bag, in use, must encompass both the aircraft component and at least

a portion of the apparatus on the opposite side of the shaped surface to the aircraft component.

23. An apparatus according to claim 20, wherein the apparatus includes a base which supports the shaped surface and the apparatus is arranged such that the bag, in use, must at least partially be sealingly attached to the base.

24. An apparatus according to claim 20, wherein the bag is reusable.

25. An apparatus according to claim 1, wherein the apparatus is in the form of a creep-forming tool.

26. An apparatus according to claim 1, wherein the apparatus is arranged so that it is suitable for modifying the shape of metallic components.

27. A method of modifying the shape of an aircraft component by creep forming the component, the method including the steps of

providing a shaped surface and an intermediate member, said intermediate member located between said shaped surface and said aircraft component, wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements separated by gaps, the shape to which the component may

be modified being dependent on the shape defined by a notional smooth surface enveloping the elements and bridging the gaps, the intermediate member being sufficiently stiff that during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps,

forcing an aircraft component against the shaped surface, via the intermediate member, in a manner that modifies the shape of the aircraft component, and

removing the aircraft component.

28. A method according to claim 27, wherein immediately prior to the performance of the step of forcing the component against the shaped surface, the intermediate member is substantially flat.

29. A method according to claim 27, wherein the method is performed a multiplicity of times and the same intermediate member is used on each occasion.

30. A method according to claim 27, wherein the step of forcing of the aircraft component against the shaped surface causes the aircraft component to undergo plastic deformation.

31. A method according to claim 27, wherein the method includes a step of releasing the component from the shaped surface and after the release of the component the shape of the component changes significantly.

32. A method according to claim 27, wherein, before performance of the step of forcing of the aircraft component against the shaped surface, the aircraft component is generally flat in shape.

33. A method according to claim 27, wherein, during performance of the step of forcing of the aircraft component against the shaped surface, the aircraft component slides over the shaped surface within predefined boundaries.

34. A method according to claim 27, wherein the aircraft component is forced against the shaped surface by means of an air pressure difference.

35. A method of modifying the shape of an aircraft component by creep forming the component, the method including the steps of

providing a shaped surface, wherein the shaped surface is defined by an open structure, the open structure including spaced apart elements separated by gaps, the shape to which the component may be modified being dependent on the

shape defined by a notional smooth surface enveloping the elements and bridging the gaps, an intermediate member, positioned between said shaped surface and said component, being sufficiently stiff that during the forcing of the aircraft component against the shaped surface, the intermediate member deforms substantially to the shape of said notional smooth surface, but suffers substantially no local deformation in regions of the intermediate member that bridge the gaps,

forcing, by means of an air pressure difference, an aircraft component against the shaped surface in a manner that modifies the shape of the aircraft component, and

removing the aircraft component, wherein the air pressure difference is at least partially provided by suction via a bag of a bagging apparatus, the bag encompassing both the aircraft component and at least a portion of the support structure on the opposite side of the shaped surface to the aircraft component.

36. A method according to claim 35, wherein the shape of a further aircraft component is modified by performing the method with the use of the same bag.

37. A method of creep forming a metallic component including performing the steps of the method of claim 27.

38. An aircraft component formed by use of an apparatus according to claim 1.

39. An aircraft including an aircraft component according to claim 38.

X. EVIDENCE APPENDIX

None.

XI. RELATED PROCEEDINGS APPENDIX

None.